Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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JUN 25 1998

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of:	)	
	)	
Federal-State Joint Board on Universal Service	)	CC Docket No. 96-45
	)	CC Docket No. 97-160
	)	DA 98-1055
Forward-Looking Mechanism for High Cost Support for Non-Rural LECs	)	
	)	

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COMMENTS OF GTE

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SUMMARY

By Notice dated June 4, 1998, the Common Carrier Bureau sought comment on two issues: (i) whether the state sponsored cost studies filed with the Commission comply with the ten criteria set forth in Paragraph 250 of the Commission's *Universal Service Order* and should therefore be approved, and (ii) whether Criterion Five should be waived to permit states to adopt truly forward-looking economic lives to calculate depreciation expense. Three states in which GTE operates -- Hawaii, Kentucky, and Minnesota -- submitted universal service cost studies generated by the HAI Model. The HAI Model, even as modified by each state commission, fails to satisfy the majority of the Commission's ten criteria. Accordingly, the cost studies generated by this model should be rejected.

The failure of the HAI Model to comply with the majority of the ten criteria stems from the Model sponsors' transparent desire to produce the lowest possible cost estimates and thereby reduce their universal service fund contribution. Time after time, the Model developers have ignored, distorted, or side-stepped the Commission's explicit directives in pursuit of this goal. GTE's Comments expose how use of this flawed cost model for universal service cost estimation will neither promote the development of efficient local competition nor replace the current system of implicit support with a competitively neutral funding mechanism.

Criterion One

The HAI cost study submitted by the Hawaii, Kentucky, and Minnesota Commissions fails Criterion One because it does not accurately locate customers, designs distribution plant that does not connect the network, impedes the provision of advanced services, does not accurately model GTE's wire centers, understates switching costs, and models unreasonable plant mix assumptions.

Criterion Two

The HAI model fails to include all costs for digital loop carriers, drop lengths, operations support systems, and emergency 911 and thereby fails Criterion Two.

Criterion Three

The HAI model default inputs are not verifiable, nor do they reflect current costs. Instead, these default values are little more than guesstimates of paid consultants. Accordingly, the HAI model defaults do not satisfy Criterion Three.

Criterion Five

The cost study submitted by the state of Hawaii violates Criterion Five because it does not incorporates depreciation lives and net salvage values that are foward-looking. Several of the depreciation lives and salvage values adopted exceed the FCC-authorized ranges.

Criterion Six

The HAI model fails Criterion Six because it builds a network only to households that currently receive service.

Criterion Seven

The cost study submitted by the state of Kentucky adopts a common cost factor of 10.4 percent based upon an analysis of AT&T's own operations. Since this figure bears no relationship to GTE specifically or local exchange providers generally, the Model does not assign a reasonable allocation of joint and common costs to supported services.

Criterion Eight

The HAI Model fails to comply with all three of the Commission's directives in Criterion Eight. The HAI Model is not open or verifiable, its engineering assumptions are not reasonable, and its outputs are absolutely implausible.

Criterion Nine

Because the engineering constraints are part of the proprietary pre-processing of the Model, they cannot be modified or examined, and therefore violate Criterion Nine.

The Commission Should Waive Criteria Four and Five

Criteria Four and Five, which concern cost of capital and depreciation expense, should be waived. Neither the FCC-authorized rate of return of 11.25 percent nor the FCC-authorized depreciation lives are forward-looking.

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	)	

COMMENTS OF GTE

GTE Service Corporation and its affiliated domestic telephone operating companies (collectively "GTE")[1] respectfully submit their Comments on the Common Carrier Bureau's Public Notice in the above-captioned proceedings.[2]

I. INTRODUCTION

The two basic goals of the universal service program being developed and implemented by the Commission are: (i) to promote the development of efficient local competition, and (ii) to replace the current system of implicit support with an explicit and

1/ GTE Alaska, Incorporated, GTE Arkansas Incorporated, GTE California Incorporated, GTE Florida Incorporated, GTE Hawaiian Telephone Company Incorporated, The Micronesian Telecommunications Corporation, GTE Midwest Incorporated, GTE North Incorporated, GTE Northwest Incorporated, GTE South Incorporated, GTE Southwest Incorporated, Contel of Minnesota, Inc., GTE West Coast Incorporated, and Contel of the South, Inc.

2/ Common Carrier Bureau Requests Further Comment on Selected issues Regarding the Forward-Looking Economic Cost Mechanism for Universal Service Support, CC Docket Nos. 96-45, 97-160; APD No. 98-1 (Public Notice) (rel. June 4, 1998).

competitively neutral funding mechanism. The cost studies being considered by the Commission are the means by which these goals are to be achieved; the ten criteria specified in the Commission's *Universal Service Order*[3] are the standard by which the cost studies are to be judged.

The Common Carrier Bureau has requested comments on the Universal Service cost studies submitted by individual states. Specifically, the Common Carrier Bureau seeks comment on (1) whether the cost studies submitted by individual states meet the Commission's ten criteria, and therefore should be approved to calculate federal support for non-rural carriers in rural, insular, and high cost areas; and (2) whether the Commission should approve the request for waiver filed by Ameritech Michigan concerning Criterion Five of the *Universal Service Order*. GTE's Comments will demonstrate that the cost studies submitted by the states of Hawaii,[4] Kentucky,[5] and Minnesota,[6] which have been generated by the HAI Model,[7] fail to satisfy the majority of

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3/ Federal-State Board on Universal Service, Report and Order, CC-Docket No. 96-45, FCC 97-157, ¶ 250 (rel. May 8, 1999) [hereinafter *Universal Service Order*].

4/ Docket No. 7702, Order 16272, dated 4/3/98, adopted Hatfield 3.1 with modifications. Docket No. 7702, Order 16331 (May 12, 1998) (clarifying that all but four of default inputs for Hatfield 3.1 Modified were adopted.

5/ Administrative Case No. 360 (May 22, 19998) (adopting HAI 5.0a).

6/ Docket No. P-999/M-97-909 (June 4, 1998) (adopting HAI 5.0a).

7/ The Hawaii Commission adopted Version 3.1 of the Hatfield Model, but ordered AT&T to modify the model to comply with the FCC criteria. Instead of modifying Version 3.1, AT&T submitted an entirely new version, Version 5.0a, referring to it as Hatfield Model Version 3.1 Modified-Hawaii. Therefore, in actuality, all these commissions adopted the same platform -- HAI 5.0a.

the ten criteria. Specifically, the HAI Model ("HAI 5.0a" or "Model"), as modified by each state commission, fails to satisfy Criteria One, Two, Three, Six, Eight, and Nine. In addition, the cost study submitted by the Hawaii Commission also fails to comply with Criterion Four, whereas the cost study submitted by the state of Kentucky fails to comply with Criterion Seven.

The failure of the HAI Model to meet most of the Commission's ten criteria stems from the Model sponsors' transparent desire to produce the lowest possible cost estimates – thereby reducing their contribution to universal service. The HAI sponsors have distorted forward-looking costs, seizing upon the "least-cost" principle contained in the Commission's definition[8] -- regardless of whether such costs are attainable, efficient in the long run, or produce a reliable, functioning network. To this end, the HAI Model proponents ignore published data, engineering standards, and vendor quotations and specifications -- often overriding these data sources with their own "expert opinion." The HAI Model developers improperly extrapolate past technological efficiencies and price reductions far into the future, thus failing to incorporate *today's* technology, efficiency levels, and prices. Most critically, the HAI Model designs a network that will not provide reliable local telephone service -- modeling service levels not sufficient to meet current requirements, much less the requirements of an information

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8/ The Commission has defined forward-looking economic cost as "the cost of producing services using the least cost, most efficient, and reasonable technology currently available for purchase with all inputs valued at current prices." *Universal Service Order*, ¶ 224 n. 573.

superhighway. For the reasons discussed more fully herein, the Commission should reject the cost studies submitted by the states of Hawaii, Kentucky, and Minnesota.

Secondly, GTE urges this Commission to waive the requirement of Criteria Four and Five, in order to allow any state commission to adopt truly forward-looking cost of capital and depreciation expense inputs.

II. THE HAI MODEL FAILS CRITERION ONE.

Criterion One mandates:

> **The technology assumed in the cost study must be the least-cost, most efficient, and reasonable technology for providing the supported services that is currently being deployed. A model, however, must include the incumbent LECs' wire centers as the center of the loop network and the outside plant should terminate at incumbent LECs' current wire centers. The loop design incorporated into a forward-looking economic cost study or model should not impede the provision of advanced services. For example, load coils should not be used because they impede the provision of advanced services. Wire center line counts should equal actual incumbent LEC wire center line counts, and the study's or model's average loop length should reflect the incumbent carrier's actual average loop length.**

As further refined by this Commission in its February 27, 1998, Public Notice,[9] satisfaction of the directives of Criterion One requires, at minimum, an examination of (a) the customer location methodology, (b) design of feeder and distribution plant, (c) loop design, (d) switching configuration, and (e) plant mix assumptions. The HAI 5.0a

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9/ *In the Matter of State Forward-Looking Cost Studies for Federal Universal Service Report*, CC Docket Nos. 45 and 97-160, Public Notice, DA 98-217 (rel.February 27, 1998). [Hereinafter "*Public Notice*."]

cost studies submitted by the Hawaii, Kentucky, and Minnesota Commissions fail Criterion One in the following respects: (i) they does not accurately locate customers, (ii) the design of the distribution plant results in loop lengths that cannot connect customers to the network, (iii) they impede the provision of advanced services, (iv) they does not accurately model GTE's wire centers, (v) switching costs are understated, and (vi) plant mix assumptions are unreasonable.

A. The HAI Customer Location Methodology Does Not Accurately Locate Customers.

The ability of a cost model to reliably estimate the cost of provisioning a forward-looking network is dependent upon its success in locating customers. As the Commission has recognized, "[a]ssumptions about the location of the population can have a large impact on the support amounts that the models predict because these assumptions determine the predicted loop length."[10] The HAI Model relies upon its heralded geocoding method and claims that geocoding permits a far more accurate determination of customer location. The HAI Model Documentation boldly claims that: the new databases "determine the *actual precise locations* of as many customers as possible."[11] This assertion, however, is vastly overstated. Geocoding, as implemented in the HAI Model, does not accurately locate customers because of three significant shortcomings: (i) the success rate for geocoding is extremely low, especially in rural

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10/ Federal-State Joint Board on Universal Service, Further Notice of Proposed Rulemaking, CC-Docket 96-45, ¶ 44 (rel. July 18, 1997) [hereinafter *FNPRM*].

11/ HAI Model Documentation at 5 (emphasis added).

areas, (ii) the databases used to geocode are neither complete nor reliable, and (iii) the "surrogate" method of locating customers, as it is referred to in HAI, is completely arbitrary.

The HAI sponsors concedes that only 56 percent, 66 percent, and 76 percent of households are geocoded in the states of Hawaii, Kentucky, and Minnesota, respectively.[12] This low success rate alone is reason to reject the HAI Model. The success rate of HAI's geocoding is so poor, in fact, that an understanding of the process is arguably not necessary. The low success rate is due partlyto the fact that customers with post office box and rural route addresses are not geocoded by the Model. Even for the customers that can be geocoded, the success rate varies *dramatically* depending on the density of the zone.

While HAI sponsors admit that locating customers in high-cost areas -- the two lowest density zones in the HAI Model[13] -- is vital to accurately assessing the universal support needs of those areas, its cost model simply fails to deliver. In Kentucky, the HAI sponsors estimate that only 21 percent of the customers in density zone 0-5 lines/sq. mile are geocoded, and only 41 percent are geocoded in density zone 6-100

12/ Ex Parte Submission, Federal-State Joint Board on Universal Service, CC Docket No. 96-45, MCI Telecommunications Corporation, February 3, 1998 [hereinafter "*Ex Parte Submission of MCI*"].

13/ On a nationwide basis, approximately 99 percent of customers entitled to universal service support are located in the two density zones below 100 lines/sq. mile. *Ex Parte Submission of MCI.*

lines/sq. mile. Similarly low success rates were reported in Hawaii and Minnesota.[14] These results are simply too low to engender any confidence that universal service costs are accurately predicted.

Even where geocoding is successful, its accuracy is highly questionable. As GTE demonstrated in its previous Comments,[15] the Metromail, Inc. ("Metromail") database that serves as a basis for the HAI Model's *residential* customer base is flawed in several significant respects:[16]

- No independent source has verified whether each record has a match-code indicator field or how many records with different street addresses have identical latitudes and longitudes.

- The PNR documentation itself states that the Metromail database includes duplicate records, which can skew the results.[17]

- On two separate occasions (within a month's time), Metromail has reported conflicting address counts contained in its database.[18]

14/ The success rates for Hawaii were 19 percent, and 41 percent in the lowest two density zones, whereas in Minnesota the rates were 8 percent and 44 percent. *Ex Parte Submission of MCI.*

15/ Comments of GTE, CC Docket Nos. 96-45, 97-160 at 3-7 (filed June 1, 1998) ("GTE Comments").

16/ *Id.*

17/ HAI Model Documentation at 21.

18/ As shown in Exhibit 1 to GTE's Reply Comments, on June 12, 1998, Metromail first reported 74.4 million named and unnamed address records for the 50 states. On December 23, 1997, Metromail updated this number to 98.2 million. Using these two estimates, a comparison was made to the 1996 Bureau of Census Data on a state-by-state basis. The results of this analysis, attached as Exhibit 1 hereto, illustrate that the Metromail database does not contain 100 percent of residential households as reported by the Census Bureau. (AT&T and MCI cite the database's accuracy as "over 90

(continued...)

- No in-depth analysis has been performed on any of the other databases[19] used by the HAI Model. For example, 1 million surrogate points had to be added to the Dun & Bradstreet business database to "shore" it up, raising concerns about the reliability of this data.

Thus, even where the customer locations have been geocoded, there is no guarantee that the process was accurate.

B. The HAI Model's Distribution Plant is Flawed.

Distribution cable is an essential component of the loop. However, even a cursory look at some of the clusters in GTE's wire centers casts doubt upon the precision of the process used to produce distribution clusters by the HAI Model. For example, in GTE's MNTIKYXA wire center in Kentucky, the model contains a cluster of 5.88 square miles, 8 lines, and 6 locations. These locations are represented by lots with dimensions 3,366 x 7,266 (605 acre lots). Not only does such an outcome raise the question of how precisely customers are located when it counts, but it also makes one wonder how the 150 foot drop lengths assumed by the HAI Model are adequate to serve lots with over 1,000 feet of frontage.

(...continued)
percent.") The analysis in Exhibit 1 indicates 67.8 percent and 89.4 percent respectively based on Metromail's responses. A careful examination of this data further reveals that inherent problems may exist since only 75 percent of Hawaii's households, but 103 percent of Oregon's, are included – again raising serious reliability concerns.

19/ Dun & Bradstreet's National Database, USPS ZIP+4 directory, and Geographic Data Technology's enhanced street network files.

A second example is the cluster in GTE Kentucky's CMVLKYXA wire center, which has 2,437 lines and an area of 0.73 square miles.[20] Not only does this cluster violate the upper limit of 1,800 lines that was supposed to constrain cluster formation, but its density of 3,319 lines/square mile (2,437/0.73) greatly exceeds the 162 lines per square mile used to perform cost calculations.[21]

As illustrated in Table 1 below, other GTE wire centers contain extremely large clusters that violate the very engineering constraints repeatedly imposed by the HAI Model developers.

Table 1

Wire Center	Cluster Size Square Miles	Lines	Locations	Lot Dimensions		Average Lot Size Acres
				Frontage Feet	Depth Feet	
HANAHICO	8.5	8	7	4006	8013	737
MINTIKYXA	9.45	11	10	3681	7361	622
MCGRMNXM	10.27	6	6	5085	10169	1187

By the modelers own account, a cluster that exceeds the 1,800 line threshold exceeds the capacity of an OC-3 fiber optic transmission system used to feed a digital

20/ Sixty-two clusters in GTE's serving areas in Kentucky exceed the 1,800 line constraint that was allegedly supposed to apply in forming distribution areas.

21/ Certain cost inputs vary with density. For example, the correct density category (2,550-5,000) has higher costs for buried drop placement, uses more underground structure, and closer pole spacing than does the density category (850-2,550) used to determine costs for this cluster.

loop carrier ("DLC") remote terminal. Yet as Table 2 demonstrates, the HAI Model violates this constraint.

Table 2

State	Average Lot Size (acres) Over all Clusters	No. of Clusters With Lot Greater Than Average	No. of Clusters With More Than 1800 Lines
HI	26.3	337	59
KY	58.8	574	62
MN	140	450	3

Sprint first brought the discrepancies in the HAI Model's distribution plant to the FCC's attention.[22] Sprint found a number of clusters in Nevada where the HAI Model failed to produce as much Distribution Route Distance ("DRD") as necessary. This led to a more in-depth analysis of GTE's operating areas in Minnesota.[23]

Using an algorithm developed by Stopwatch Maps, Inc. that runs on Map Info (mapping software), GTE calculated a Minimum Spanning Tree ("MST") for all clusters in its Minnesota serving territory.[24] The MSTs generated by Stopwatch Maps' algorithm

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22/ "As result of Sprint's warning of possible flaw in HAI Cost Model (HCM), FCC computer experts ran analysis that also showed model may underestimate costs of providing universal service in rural areas . . . ." *Communications Daily*, May 22, 1998, Vol.18, No. 99.

23/ Pursuant to an Order entered in Minnesota, GTE was granted limited access to PNR's information on GTE's Minnesota serving areas.

24/ A MST is a mathematical graph theory construct used to connect a set of points in a network at the least possible distance.

was used as the *low-end* benchmark to assess the results of the PNR/HAI Model data and algorithms.

To make a valid comparison, it was necessary to calculate the drop length included in the HAI Model in addition to the DRD. The drop length in the HAI Model was calculated using two different methodologies: (1) the total drop length based on the *number of locations* was added to the HAI Model reported total distribution length; and (2) the total drop length based on the *sum of total number of households and businesses* was added to the HAI Model reported total distribution length. Since the results for the two methods of calculating drop cable length differed only minimally (often less than 1 percent), the data produced using the first method was used.

Next, the ratio of the length of each MST to the modeled distribution distance plus drop was calculated for the same cluster and summarized by density zone and by wire center. Based on the results of this analysis, GTE determined that 77 percent of all the clusters in Minnesota service areas contain less distribution plant than is physically necessary to connect GTE's existing customers. This defect is not insignificant. In some clusters, the PNR/HAI Model algorithm produces estimated lengths that are less than 10 percent of the minimal plant necessary. When looking at the clusters contained in the lowest density zone, the underestimation of plant produced by the PNR/HAI Model algorithm is 31 percent compared to that produced using MSTs.

GTE estimates that the PNR data, as used by HAI Model, understates total plant in GTE's Minnesota service territories by at least 12 percent.

This is further complicated by the fact that the MST is a low-end benchmark. The line segments of a MST run directly from one point to another and do not represent the actual amount of DRD required to connect customers as the MST ignores geographical features such as mountains, rivers, rights-of-way, etc.

The HAI Model severely underestimates outside plant required for the provision of service to customers. It does not represent the network that an efficient company would engineer or install.

C. The HAI Model Impedes the Provision of Advanced Services.

The Hawaii and Minnesota Commissions each accepted the HAI Model sponsors' assertion that an 18,000 foot copper loop will provide advanced services.[25] The Kentucky Commission selected 15,000 feet as the maximum distance of the copper loop based on "[their] expectation that forward-looking technology will permit the longer loop."[26] Their reliance is misplaced.

25/ Universal Service Fund Cost Study Submission of the State of Hawaii, CC Docket Nos. 96-45 and 97-160 at 7 (April 27 , 1998) [hereinafter "*Hawaii Cost Study Submission*"]; Universal Service Fund Cost Study Submission of the State of Minnesota, CC Docket Nos. 96-45 and 97-160 at 6 (May 26, 1998) [hereinafter *Minnesota Cost Study Submission*"].

26/ *In the Matter of An Inquiry Into Universal Service and Funding Issues*, Administrative Case No. 360 at 21 (May 22, 1998).

The HAI Model does not properly design copper loops and therefore will prevent some rural subscribers from utilizing today's standard dial-up modem speeds[27] or accessing advanced services. This is inconsistent with both the requirements of the Telecommunications Act of 1996 Act, 47 U.S.C. § 254, and the Commission's forward-looking technology requirement. This network deficiency is the result of two assumptions made by the HAI Model developers: (1) that the Carrier Serving Area ("CSA") design standard can be ignored; and (2) obsolete copper T-1 technology can be used to provide service to customers on road cable.

The CSA design standard limits the total copper loop length to 12,000 feet,[28] thereby assuring optimal voice and data transmission. The HAI Model designs copper loops that extend out to 18,000 feet, in violation of this standard. In fact, a significant number of HAI Model clusters violate the 18,000 feet design constraint as demonstrated in Section II.B. The result, which the HAI Model proponents claim is an improvement over competing models, is fewer and larger DLC Remote Terminals.[29]

27/ As the *Lucent Outside Plant Engineering Handbook* at 3-16 (1996) states, "[t]o meet the 64-kb/s transmission rate, the secondary system cables within a CSA must not exceed 9,000 feet (2743 m) in a 26-gauge (0.4 mm) design area and 12,000 feet (3658 m) in a 24/22/19-gauge (0.5/0.6/0.9 mm) area."

28/ *Bellcore Notes on the Networks*, Special Report SR-2275, Issue 3 at 12-5 (Dec. 1997); Lucent Outside Plant Engineering Handbook § 13 (1996).

29/ Testimony of AT&T Witness James W. Wells before the Kentucky Public Service Commission, Administrative Case No. 360 at 116 (Mar. 5, 1998).

The Modelers' rationale for this modification is that the CSA standard has been superseded by newer technologies.[30] This claim, however, is inconsistent with current industry-accepted empirical data sources: the December 1997 *Bellcore Notes on Networks*;[31] the July 1997 *DSC Litespan Engineering and Planning Practice*; and the *Lucent Outside Plant Engineering Handbook*, all of which cite 12,000 feet as the CSA standard.[32]

The HAI proponents cited Revised Resistance Design ("RRD") standards as support for their use of the 18,000 foot copper loops.[33] The RRD standard is a slight modification to the original resistance design standard that was used to ensure loop and switch compatibility for voice transmission prior to the introduction of DLCs in 1980; it is not suited to today's networks. RRD guarantees that subscribers receive sufficient loop current to power their transmitters and assures voice transmission within the RRD limits. However, it has the same difficulties regarding the use of today's dial-up

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30/ Testimony of John Donovan, Alabama Public Service Commission, Implementation of the Universal Service Requirements of Section 254 of the Telecommunications Act of 1996, Docket No. 25980 at 1696-1697, 1707-1709 (Feb. 25, 1998).

31/ Bellcore Notes on the Networks, Special Report SR-2275, Issue 3 at 12-5 (Dec. 1997).

32/ The Digital Switch Corporation's Litespan is the GR-303 DLC used by the HAI Model.

33/ HAI Model Inputs Portfolio at 35.

modems and ADSL transmission and thus will still prevent rural subscribers from fully utilizing today's dial-up modem capabilities and subscribing to advanced services.

The provision of advanced services is further impeded by the technology, copper-based T-1 DLCs, employed in the HAI Model. Copper-based T-1 DLCs are a 1970s technology requiring specialized design and cable conditioning to function properly and new routes are not being installed by carriers today. As Don J. Wood, a sponsor of the HAI Model, has confirmed, "[t]here are existing DLC systems that utilize copper wire pairs, but forward-looking DLC architectures assume the use of fiber optics transmission facilities."[34] Similarly, John Lynott, a sponsor of AT&T's non-recurring cost model, has stated that the use of T-1 DLCs on copper loops under any circumstances cannot be considered forward-looking in a digital loop carrier environment.[35]

Quite simply, this outdated technology would prevent rural subscribers from receiving advanced services. ADSL transmission, as defined by the FCC, is optimal at 6.144 Mbit/sec.[36] However, since the T-1 transmission rate is 1.544 Mbit/sec (24 - 64

34/ Direct Testimony of Don J. Wood on Behalf of AT&T and MCI Before the North Carolina Public Service Commission, Docket No. P-100Sub 133d at 12 (Feb. 16, 1998).

35/ Deposition of John Lynott, in the State of California Before the Public Utilities Commission, Docket Nos. R.93-04-003 and I.93-04-002, pp. 436 - 37 (Nov. 19, 1997). *See also*, Reply Comments of the Rural Utilities Service on Outside Plant Structure, CC Docket No. 97-160 ("no one is installing new copper T1 systems in rural America today, except, in a few cases, on existing plant").

36/ Federal Communications Commission, *In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, CC Docket No. 96-98,
(continued...)

Kbit/sec DS0 channels plus overhead), the T-1 DLCs envisioned by the HAI Model will be incapable of carrying ADSL service to rural subscribers on road cables.[37]

The necessity of fiber-based technology is further evidenced in the current marketing strategies of Incumbent Local Exchange Carriers ("ILECs"). ADSL services are currently offered by several Regional Bell Operating Companies and GTE to meet customer demand for faster on-line and Internet service. However, since customers more than two miles from the wire center will not be able to benefit from these technologies, at least one RBOC has announced plans to utilize fiber-based DLC systems to overcome the distance limitations of ADSL.[38] Clearly, the HAI Model's use of 3.5 mile long copper loops and copper-based 1.5 megabit T-1 carriers will prevent a sizeable number of customers from using these technologies.

(...continued)
Interconnection between Local Exchange Carriers and Commercial Mobile Radio Service Providers, CC Docket No. 95-185, at ¶ 380 n. 823, First Report and Order (released August 8, 1996).

37/ In a South Carolina proceeding, AT&T Witness James Currin offered testimony supporting this argument. First, Mr. Currin confirmed that GTE's policy of limiting copper loops to 12,000 feet and serving longer loops with a combination of fiber and copper is appropriate. In addition, a chart contained in Mr. Currin's testimony indicated that the HAI Model cannot provide the full range of ADSL-type services because, at 18,000 feet with 24 gauge cable, the maximum data rate is one-and-one-half to two megabits per second. Rebuttal Testimony of James W. Currin on Behalf of AT&T Communications of the Southern States, Inc., South Carolina Public Service Commission, Docket No. 97-239-C at 19 (Mar. 2, 1998).

38/ Bell Atlantic To Offer ADSL-Based Service Starting in Mid-1998," Bell Atlantic News Release.

D. The HAI Model Does Not Accurately Model GTE's Actual Wire Center Line Counts.

As the Minnesota Commission correctly recognized[39] the HAI Model line counts do not equal GTE's actual wire center line counts and ordered GTE-specific line counts to be incorporated into the Model.[40] The Hawaii Commission and Kentucky Commission did not address line counts specifically.

For the state of Hawaii, GTE determined that 69 percent of the HAI modeled wire centers contain line counts that are off by more than +/- 10 percent. Likewise, for the state of Kentucky, 62 percent of the wire centers contain line counts that are off by more than +/- 10 percent. Accordingly, the cost studies submitted by Hawaii and Kentucky violate Criterion One.

E. HAI's Switching Investment Is Understated.

The HAI Model develops a spurious switching investment curve from incompatible and unidentified data sources. HAI 5.0a disregards acceptable switch engineering guidelines, omits significant switching components, and picks and chooses selected data from a Northern Business Information ("NBI") publication in order to produce the desired result -- low costs. This unsound methodology should be rejected

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39/ GTE does not endorse Minnesota's method of correcting this deficiency, but agrees that the HAI Model does not accurately model GTE's line counts.

40/ *Minnesota Cost Study Submission* at 3.

by the Commission. HAI's switching costs have already been tentatively rejected by the Joint Board in favor of costs based upon "actual ILEC switching purchases."[41]

Moreover, the Model does not consider usage in the design of the switching network. Switching engineers size their network to carry the load measured in Centum Call Seconds ("CCS"). This is one of the most important measurements that local telephone companies use to size and monitor their networks. The HAI Model neither displays CCS nor provides a user-adjustable input for CCS per line. HAI uses its own unique approach, completely ignoring traffic peaks, that is neither effective nor accepted in the engineering community. To properly design and engineer a switch, a network engineer must consider the composite usage of all lines and trunks in order to calculate the overall line concentration ratio ("LCR") for a given switch. Based upon the LCR, an engineer will determine the number of lines that can be contained in a peripheral unit. The HAI Model fails to make this calculation, which makes it impossible to properly engineer the necessary peripherals and common equipment.

The Model does not model any particular vendor's switch, as suggested by the *Public Notice*.[42] In particular, HAI 5.0a models switches that have smaller capacities than the minimum commercially-available switches. Both Lucent and Nortel switches

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41/ *FNPRM*, ¶ 132.

42/ *See Public Notice*, ¶ B.1(b).

require other peripheral and common equipment to accommodate single line growth. HAI simply ignores the costs associated with this peripheral and common equipment.

The cost studies submitted by Hawaii, Kentucky, and Minnesota also fail to incorporate host/remote architecture as mandated in the *Public Notice*.[43] While HAI 5.0a is theoretically capable of modeling hosts and remotes, there are *two* practical problems with the Model's approach:

> (1) HAI 5.0a designates this as a user-function which none of these state commissions have decided to use, thus rendering this option useless. Since the HAI Model was run in default mode to produce costs in Hawaii, Kentucky, and Minnesota - no remotes are placed, stand-alone switches are assumed, per-line prices are utilized for investment calculations, and fixed costs are ignored.
>
> (2) The HAI proponents have criticized the embedded network configurations found in the Local Exchange Routing Guide ("LERG") as not being optimal, however, the Model does not provide the user with any information regarding how to create an optimal network using host and remote switches.

F. The HAI Default Plant Mix Assumptions Are Unreasonable.

This defect applies only to the cost studies submitted by the states of Hawaii and Kentucky. The Minnesota Commission rejected HAI's default inputs for plant mix, properly electing to use Minnesota-specific values in their study.

43/ *See Public Notice*, ¶ B.1(b).